

HEPC PROGRAM REVIEW SUMMARY

Degree Program:	BS Biology Bachelor of Science Degree
External Reviewer:	Mark Flood, PhD
Reviewer Email:	mflood@fairmontstate.edu

1. Provide a synopsis of significant findings from the external reviewer and include:

- A. Strengths:** The biology faculty and staff are exceptional. The research and scholarship of the biology program is superior to that of any other small university in the state and region. The ability of this program to grow and maintain student numbers is outstanding.
- B. Challenges:** The lack of institutional support, adequate space, and necessary finances are a real problem that will ultimately prevent any further growth or even sustain the current student numbers, programs, and course offerings.
- C. Recommendations:** Invest more into the Biology infrastructure, educational budget, and number of faculty and staff in this program.

Synopsis of external review

Strengths:

- 1) The mission and student learning objectives of the biology program are consistent the University's mission.
- 2) The level of assessment as well as the depth of knowledge the program assesses appears to be both appropriate and well-documented.
- 3) Student growth has shown a two-fold increase in the last five years for the Biology program. West Liberty has a Zoo Science degree and also agreements with medical and dental schools. The faculty and staff in Biology have created programs that will keep the demand high for many years to come. With an approximate doubling in the number of graduates during the last five years, the program has the unique problem of possibly being too popular, placing a cumbersome workload on the current faculty and staff.
- 4) The Biology students are finding success after graduation. 86% of the biology graduates either have jobs or are advancing their education in graduate or professional schools which indicates a solid degree that produces employable graduates.
- 5) Course enrollments have doubled in the past five years.
- 6) With the addition of a graduate program and the new agreements with professional schools, it can easily be seen that the program has a solid curriculum that is being delivered by exceptional instructors.
- 7) The WLU Biology faculty do an amazing job of giving students hands-on, real-world experiences in the workplace as well as introducing the students to professionals in the field.
- 8) Biology faculty stated they get along well with other various programs on campus when it comes to scheduling all the diverse courses that must be taught in order for students to graduate in a timely fashion.
- 9) The level of community outreach is sufficient.
- 10) The biology faculty have exhibited dedication toward student retention and graduation.
- 11) The Biology program has outstanding faculty.
- 12) The amount of undergraduate and graduate level research coming from Biology at WLU is unmatched in the state of West Virginia and the region.

HEPC PROGRAM REVIEW SUMMARY

Synopsis of external review

Challenges and Recommendations:

- 1) At this time, there are simply not enough resources devoted to these dedicated faculty and staff members in the biology program. Basic needs (such as adequate and dependable power in Arnett Hall) are not being met
- 2) Although undergraduate students get sound educational opportunities for mentoring in terms of research and they also can receive academic tutoring from the current graduate students, the current course loads, committee work, and scholarship prevent faculty from having enough time for the type of rich and nuanced academic advising needed for a successful program. West Liberty is known for its open-door policy, but faculty are simply stretched far too thin for the number of majors that they have.
- 3) The institutional support is not appropriate or adequate given the success of the biology program.
- 4) Additional funds dedicated to educational and research support for Biology is absolutely necessary as current resources are insufficient.
- 5) The Biology program itself needs to have more support in terms of faculty and staff to support the tremendous influx of students. More space and financial resources are also needed to support the educational goals of the Biology program.
- 6) Better marketing of the success stories of current and former students will help to maintain the high student enrollment numbers consistent in the future.

2. Address accomplishments or challenges cited in previous review and discuss steps taken to further progress and/or implement recommendations or make revisions.

Previous Review-Challenges:

- 1) Equipment – Education and research in the field of biological science requires the utilization of quality laboratory and field equipment. With budgetary restrictions that limit the potential for acquiring and maintaining this equipment, the biology program chose to look outside the university for funding, for purchasing and maintaining equipment on hand. Since the previous BOG report, faculty members of the biology department have secured approximately \$200,000 for the purchase of new equipment including a Steris autoclave, a flow cytometer, an IDEXX system, a BioTek plate reader, analytical balances, microscopes, a 3D scanner, a 3rd generation sequencer, and a Milli-Q water purification system to name a few.
- 2) Laboratories – In the previous report, the outside reviewer identified a need for additional laboratory space. The move of Chemistry to Campbell Hall opened up additional space in Arnett Hall which is sufficient for our current needs. We have also secured external funding (\$250,000) to upgrade a portion of this space. However, with the expansion of the biology undergraduate and graduate programs, the need for additional space is eminent. We have been in discussions with upper administrators and have developed a plan for Math and Anatomy to move to Campbell Hall (once the 4th floor is renovated) which will open up additional space in Arnett Hall that will be used for the biology and zoo science programs.
- 3) Faculty – In our last report, the external reviewer identified two primary areas of concern regarding faculty. This reviewer identified “salary inversions” as the biggest problem. In other words, the more senior, tenured faculty were being paid less than

HEPC PROGRAM REVIEW SUMMARY

new faculty hires. The institution is currently reviewing salaries and are attempting to gradually rectify discrepancies, especially among senior faculty. The other area of concern previously identified was that a substantial proportion of the biology faculty were junior and not yet tenured. Since this time, many of those junior faculty have been promoted and tenured, and now the department is composed of a more even blend of tenured and non-tenured faculty.

- 4) Research – The external reviewer noted on our previous review that access to the scientific literature is essential for the synthesis of new publications (which leads to additional funding and distinction). With a limited budget, the library is unable to access journal articles required to stay current in the literature. However, several faculty members (by acquiring research funding through the WV-INBRE network) have been appointed as adjunct faculty at West Virginia University and Marshall University which provides them access to the libraries of these larger universities. This, however, is not a long-term solution and does not provide the level of access that our students and faculty require.
- 5) Students – Retention of biology students was identified as a concern in our previous report. We have implemented several approaches to address this concern. We have added an additional first year biology course with an active study section to strengthen the students' ability to interact with the material outside of class. We have also recently implemented graduate-student tutoring for the undergraduate biology majors. These practices seem to be contributing to increased retention among biology majors.

Previous Review-Accomplishments:

- 1) A focus on the students – The primary objective of the biology program has been and continues to be the success of the students. This is evident through the success rate of our students for admission into medical school, physician assistant programs, dental school, graduate school, and into the workforce. The faculty of the biology program are extremely generous with their time and work with the students outside the classroom, not only with their studies, but as research mentors, advisors, career advocates, and social club coordinators.
- 2) Newly developed undergraduate majors – The biology program continues to evaluate assessment data and exit interviews from graduating students to develop degree programs that can best equip our alumni for the next step in their educational journey or their career. As a result, the biology program currently offers thirteen distinct undergraduate majors, five graduate tracks, a 5-year combined B.S. / M.S. curriculum, and an accelerated 5-year B.S. / M.S.P.A.S. curriculum. The most recently developed undergraduate biology majors include Human Biology, Zoo Science and Applied Conservation, Microbiology, Pre-veterinary Biology, Pre-medicine, and DEAP (WLU/WVU Dental Early Admission Program).
- 3) Graduate program - Our biology program also offers a graduate program in which students can pursue a traditional M.A. or M.S. (thesis option) in Biology. We also offer Zoo Science graduate curriculum (M.A or M.S [thesis option]), and a Biomedical bridge program that can guarantee medical school admission into WVSOM as long as the students meet certain criteria. West Liberty University is the only “small” institution of higher learning in the state to offer a Master’s degree in Biology. We welcomed our first class of graduate students in August of 2017, and the first cohort graduated in May 2019.

HEPC PROGRAM REVIEW SUMMARY

- 4) Student-centered research - At present, over 80 undergraduate biology majors and 20 graduate students work on research projects. In the recent past, West Liberty University undergraduate students have won various research awards. For example, three West Liberty students won best overall research presentation in the fields of Organismal Biology, Cellular and Molecular Biology, and Health Sciences at the national Alpha Chi research competition in Chicago, Illinois. In 2014 an undergraduate scientist from West Liberty won the Kathryn Hoyle Bradley Prize in Health Sciences for best presentation. Also in 2014, the Jeanette Wieser Prize in Exercise Science & Nutrition for best presentation was awarded to one of our students. In addition, a biology major won best oral presentation and another won best undergraduate poster presentation at the 2015 West Virginia Academy of Science meeting. Moreover, three undergraduates were bestowed travel awards for their research presented at the 2015 Mid-Atlantic Microbial Pathogenesis Meeting in Virginia. Three biology majors have been awarded undergraduate research fellowships from the WV-NASA Space Grant Consortium. Two West Liberty students won first and second place for their scientific poster presentations at the 2017 American Association of Anatomists Regional Meeting. Over the past five years, twenty West Liberty undergraduates received travel awards to the International Experimental Biology Conference where they have given 35 presentations (all abstracts published).
- 5) Noteworthy scholarship – In addition to participation at meetings, West Liberty University undergraduates are frequently coauthors on the aforementioned peer-reviewed publications. In fact, over the past five years, the West Liberty University biology program has produced more publications than any other primarily undergraduate institution in the state of West Virginia.
- 6) During the 2014/2015 academic year, eight of nine (90%) of the biology program faculty secured research grants, resulting in the acquisition of \$456,000.00 dedicated to research. That level of funding has been sustained through 2018 and into 2019. Our faculty have received grants from the National Institutes of Health (R15 from NHLBI), the West Virginia IDeA Network of Biomedical Research Excellence, the West Virginia NASA Space Grant Consortium, WV-EPSCoR, WV HEPC, the US Fish and Wildlife Service, and Three Rivers Quest among others. These grants not only supply funds for student-driven research, but also provide invaluable infrastructure for Arnett Hall. For instance, the biology faculty recently secured \$250,000 in funds to upgrade biomedical laboratory space and to install a rodent research suite.
- 7) In addition to authoring peer-reviewed manuscripts and acquiring extramural funding, a member of our faculty recently co-authored an anatomy textbook (a resource that will be used to educate countless students all over the world).
- 8) Expansion of the faculty - Over the past 5 years, the number of biology faculty has increased from 9 to 15. This growth was necessary to support the increasing number of biology majors and graduate students. These additional faculty members were partially individuals who were newly hired or staff members who were promoted to “Instructors.” In addition, the Biology program has acquired additional support staff (such as a departmental secretary, graduate teaching assistants, and Zoo Science animal husbandry staff).

HEPC PROGRAM REVIEW SUMMARY

3. Five-year data on graduates and majors enrolled:

Biology			HEPC Series 10 Productivity Standards Programs are required to meet at least one of the indicators listed below.		
Academic Year	Major Cds 611,613,614, 619-623, 626-629 *Enrollment	CIP 26.0101 **Awards			
			Degree Level	Awards	Enrollment
2018-19	247	36			
2017-18	213	27			
2016-17	192	24			
2015-16	182	35			
2014-15	178	17	Baccalaureate	5	12.5
5-YR AVG	191	25.8	Masters	3	4.5
*IPEDS Fall Enrollment					
** IPEDS Graduation data (July 1 - June 30)					

4. What is the process for assessment of student learning?

- 1) Pre-Post-Assessment testing is administered in courses: Bio 124-Biological Principles, Bio 200-Botany and Lab, Bio 202-203-Zoology and Lab, Bio 221-Biostatistics, Bio 325-Microbiology, Bio 401-Genetics, Bio 460-Molecular Biology, and Bio 480-Biology Capstone; exit exam only.
- 2) Computer programs are evaluated in course: Bio 221-Biostatistics
- 3) Written paper and/or oral presentation is administered in courses: Bio 124-125-Biological Principles, Bio 221-Biostatistics, Bio 303-Anatomy and Physiology I, Bio 334-Anatomy and Physiology II, Bio 306-Biotechnology I, Bio 321-Biotechnology II, Bio 317-Immunology, Bio 401-Genetics, Bio 460-Molecular Biology, and Bio 480-Biology Capstone.
- 4) Student course evaluations are offered for every course in the program.
- 5) Exit interview are conducted in Bio-480, and include a poll on the strengths and weaknesses of the Biology Program.
- 6) A focus group session is conducted during Bio-480 with individuals from outside the program to foster objectivity.
- 7) Direct and indirect assessment information is collected from all faculty in the department by the faculty assessment coordinator. The information is collated, formatted, evaluated and regularly discussed/shared at program and department meetings.

5. Describe how the most recent recommendations of the Assessment and Accreditation Committee have been addressed. A&A Recommendations March 2018:

The SLOs for program goals #3 and #4 are written in measurable terms, but the SLOs for the first two goals are not measurable. This can be easily corrected by choosing an action verb to more accurately reflect your expectations. The committee noted that you are perhaps making things more difficult for yourselves by having 11 different SLOs to measure. It may be worth

HEPC PROGRAM REVIEW SUMMARY

considering how you could develop one broader SLO for each goal, and then incorporate the current SLOs into sub goals that operationalize the new SLO but allow you to measure and report on fewer SLOs.

It is not necessary to address each general study outcome in every course, but that you integrate each GS outcome into your Program Goals/SLOs. We suspect that you are doing this, and would like to encourage you to make the connection more explicit in your report.

Your direct assessment measures seem to be identified at the course level, rather than the program level. From an assessment standpoint, it is not necessary to assess the program goals in every course, though the course goals should align with the overall program goals so that at the completion of the program, graduates have been provided the opportunity to master each of the program goals. By simplifying your programmatic assessment schedule, you may be able to make the data analysis easier and more useful.

One caution regarding your indirect measure is to be sure that they are addressing the program SLOs.

The committee would like to see more specific information in the timeline to the extent possible, and a clear connection, possibly with illustrative examples, of how data is being used and the connection between the SLOs and the assessments being administered.

The previous program review committee yielded four comments which the Biology Program has addressed.

- 1) The first of these was that the structure of various tracks/majors within the program seemed complex. Though measurement of individual track/major complexity may be subjective, the Biology Program is expansive, and caters to a wide variety of student interests. Within these tracks/majors, core courses such as BIO-124/125, BIO-207, BIO-208, BIO-200, BIO-202, BIO-203 and/or BIO-221 weave a common thread upon which specialized major-specific courses and restricted electives are added. Though ensuring uniformity, these core courses allow for diversity among tracks/majors while mitigating unnecessary complexity.
- 2) The committee noted "empty classes" appearing in the curricular maps and alignment matrices, and questioned the existence of these. To clarify, the curriculum maps display all courses required of a particular track/major, and are reviewed to ensure assessment of SLOs, yet they do not display every individual assessment performed in every course. Although the faculty of the Biology Program strongly supports assessment and clear, concise, linear alignment to the SLOs being measured, courses undergoing revision or development may appear empty on curriculum maps, as these are still required courses within their respective tracks/majors.
- 3) The committee requested clearer articulation of how the General Studies goals of the University aligned with the SLOs of the Biology Program. To this end, we have simplified and clarified the format of our SLOs, in order to linearly align to the General Studies goals of the

HEPC PROGRAM REVIEW SUMMARY

University. The aforementioned SLOs have the overarching General Studies goals of the University denoted, parenthetically, in the first section of this update document.

- 4) The committee displayed concern that assessment measures were identified at the course level, rather than at the Program level. The Biology faculty believe strongly that clear, concise, and linear alignment of Program Goals and Student Learning Objectives should enable reviewers to align an individual course—with its individual objectives—easily to the Program SLO which is being measured. As a result, the Biology faculty feels that the richness provided by alignment matrices furthers this linearity and transparency.

6. Provide data on student placement and include the number of students employed in positions related to their field of study or the number of students pursuing advanced degrees.

Over the past 5 years, the biology program has graduated 130 students. Of those graduates, 88 enrolled in graduate or professional programs, 23 work within the field of biology, 4 work out-of-field, and 15 are of unknown status. By percentage, 86% of our graduates are either continuing their education, have completed their graduate or professional education, and are working in the field either with an advanced degree or with their bachelor's degree in biology.

AY	#grads	#graduate or professional school	#employed in-field	#employed out-of-field	#unknown
2014-2015	15	12	1	1	1
2015-2016	34	24	5	1	4
2016-2017	24	15	6	0	3
2017-2018	29	22	4	1	2
2018-2019	28	15	7	1	5
Total #(%)	130	88 (68%)	23 (18%)	4 (3%)	15 (11.5%)

Biology Program Review Assessment Update Spring 2020

Joseph Nolan IV

1. Student Learning Outcomes

- 1) The student shall demonstrate a comprehensive knowledge base specific to their course of study. (GS 2)
- 2) The student shall display critical thinking and communication skills through oral and written presentation of biological ideas. (GS 1, 2)
- 3) The student shall demonstrate acquired laboratory and/or field biology skills and techniques. (GS 1, 2)
- 4) The student shall evaluate, discuss, and/or present concepts in scientific literature and relate scientific advances to contemporary issues. (GS 1, 2, 3)

The reports of this analysis and the corresponding curriculum mapping is included (see attached curriculum maps). These courses were rated based on the different levels of student learning of course material: K-knowledge/Comprehension, A-Application/Analysis, and S-Synthesis/Evaluation. In general, BIO 100-200 level courses, which are based on comprehension of material, were rated K, and BIO 300-400 courses, which require more critical thinking, are rated A and/or S. Please note, that curriculum map SLOs are consistently updated by instructors when course material is changed. In addition, faculty are currently including specific course objectives in the syllabi of their courses (COs), which address these SLOs on their syllabi.

2. Describe how/where the University General Studies student learning outcomes are integrated and assessed in the program by completing the chart below. It is an expectation that every program will be able to incorporate all three GS outcomes into their program's assessment plan.

GS SLO	How/Where assessed
Communication	Corresponds to SLO 2-4
Analysis	Corresponds to SLO 1-4
Self and Cultural Awareness	Corresponds to SLO 4 (May not be assessed in every biology course)

3. **Assessment Method (measures/instruments):** Describe assessment methods used and include examples of both direct and indirect measures.

- 1) **Direct Measures** are direct evaluations of students' knowledge and/or skills as they relate to the program SLOs. Some examples include: exams, papers, projects, computer programs, interaction with a client, or musical performances
- 2) **Indirect Measures** assess opinions or thoughts about students' knowledge/skills as they relate to the program SLOs. They gather information in some way other than directly evaluating the students work. These include asking students/graduates how well they thought they met the program goals and examples include: senior surveys, exit interviews, alumni surveys, and focus groups which are measuring students' opinions about their learning or skills as they relate to the program SLOs (not just satisfaction in general or unrelated to program SLOs).

Note: Programs should have at least three student learning outcomes, but additional rows can be added when there are more than three.

Program SLOs	Direct Measures	Indirect Measures
1) The student shall demonstrate a comprehensive knowledge base specific to their course of study	Pre-/Post-Assessment Testing, Oral Presentation, Written Paper, Computer Programs	Course Evaluations, Exit Survey, Focus Group
2) The student shall display critical thinking and communication skills through oral and written presentation of biological ideas	Pre-/Post-Assessment Testing, Oral Presentation, Written Paper	Course Evaluations, Exit Survey, Focus Group
3) The student shall demonstrate acquired laboratory and/or field biology skills and techniques.	Pre-/Post-Assessment Testing, Oral Presentation, Written Paper, Computer Programs	Course Evaluations, Exit Survey, Focus Group
4) The student shall evaluate, discuss, and/or present concepts in scientific literature and relate scientific advances to contemporary issues.	Pre-/Post-Assessment Testing, Oral Presentation, Written Paper	Course Evaluations, Exit Survey, Focus Group

Biology Program Review Assessment Update Spring 2020

Joseph Nolan IV

4. **Location of Measures:** List the direct and indirect measures and location within the program.

Note: Best practice suggest that assessment measures are most effective when “milestones” or other key assessments are distributed throughout the program. These milestones for formative assessments provide an opportunity to make adjustments before the culminating assessments of end locations like capstone, major field test, final portfolio assessment, etc.

Program SLOs	Measures	Beginning	Middle	End
SLO 1: The student shall demonstrate a comprehensive knowledge base specific to their course of study.	Direct	BIO 124/125, 200, 202/203, 208, 221	BIO 325	BIO 460, 480
	Indirect	BIO 124/125, 200, 202/203, 208, 221	BIO 303, 306, 317, 321, 325, 334	BIO 401, 460, 480
SLO 2: The student shall display critical thinking and communication skills through oral and written presentation of biological ideas.	Direct	BIO 124/125, 221	BIO 303, 306, 317, 334	BIO 401, 460, 480
	Indirect	BIO 124/125, 200, 202/203, 208, 221	BIO 303, 306, 317, 321, 325, 334	BIO 401, 460, 480
SLO 3: The student shall demonstrate acquired laboratory and/or field biology skills and techniques.	Direct	BIO 124/125, 200, 202/203, 221	BIO 306, 321, 325	BIO 401, 460
	Indirect	BIO 124/125, 200, 202/203, 221	BIO 303, 306, 317, 321, 325, 334	BIO 401, 460, 480
SLO 4: The student shall evaluate, discuss, and/or present concepts in scientific literature and relate scientific advances to contemporary issues.	Direct	BIO 221	NA	BIO 480
	Indirect	BIO 124/125, 200, 202/203, 221	BIO 303, 306, 317, 321, 325, 334	BIO 401, 460, 480

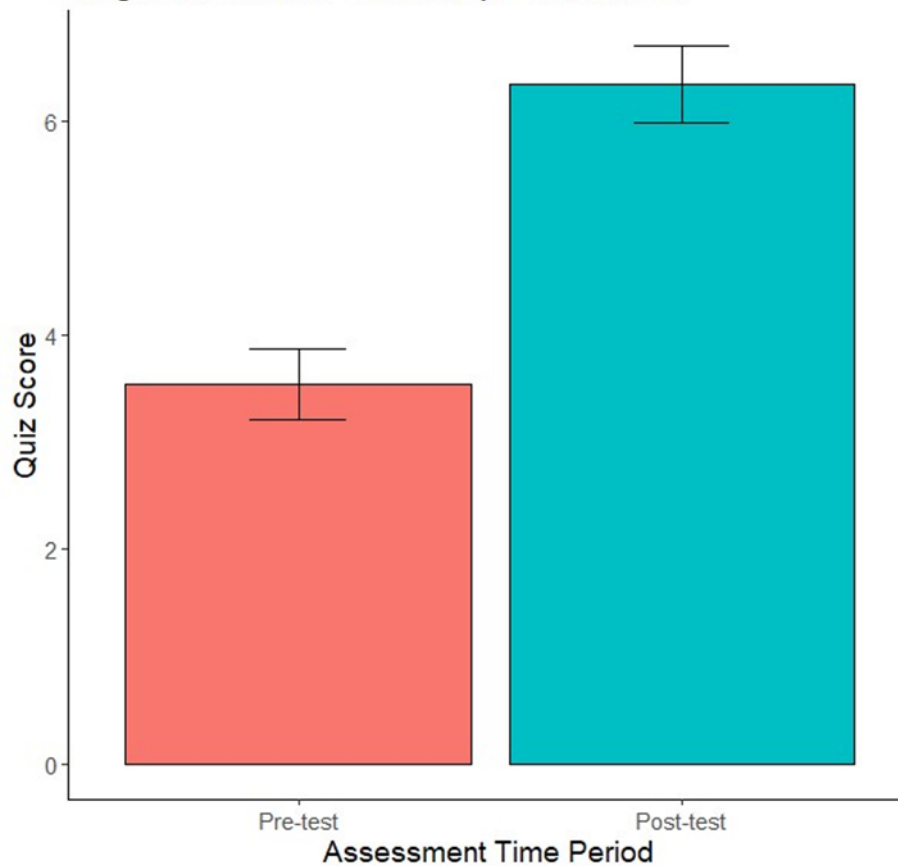
- Pre-/Post-Assessment Testing is administered in courses: BIO 124 (Biological Principles), BIO 200 (Botany and lab), BIO 202/203 (Zoology and lab), BIO 221 (Biostatistics), BIO 325 (Microbiology), BIO 401 (Genetics), BIO 460 (Molecular Biology), and BIO 480 (Biology Capstone; exit exam only).
- Computer Programs are evaluated in course: BIO 221 (Biostatistics)
- Written paper and/or oral presentation is administered in courses: Bio 124/125 (Biological Principles), Bio 221 (Biostatistics), BIO 303 (A&P I), BIO 334 (A&P II), BIO 306 (Biotechnology I), BIO 321 (Biotechnology II), BIO 317 (Immunology), BIO 401 (Genetics), BIO 460 (Molecular Biology), and BIO 480 (Biology Capstone).
- Student course evaluations are offered for every course in the program.
- Exit interviews are conducted in BIO 480, and include a poll on the strengths and weaknesses of the Biology Program.
- A focus group session is conducted during BIO 480 with individuals outside of the Biology faculty, in order to foster objectivity.

5. **Implementation:** Describe the implementation of the program’s plan since the last review (or since the beginning of the program if this is your first review) the program’s plan and include current actions.

- 1) What direct assessment data have you collected?
Direct Assessment data, separated by individual course section is forwarded to the assessment coordinator, to include: the type of assessment, whether or not the course is a general studies class, and a form of quantitative metric (e.g., Pre-/Post-Test scores). These assessment methods are reflected in the above matrix.
- 2) What indirect assessment data have you collected?
Indirect Assessment data, separated by individual course section is forwarded to the assessment coordinator, to include: the type of assessment, whether or not the course is a general studies class, and a form of qualitative metric (e.g., Recurrent themes from focus group discussion). These various methods are indicated in the above matrix.
- 3) How is the information shared with faculty in the department/program?
Assessment information is collated, formatted, and discussed through regular department and/or program meetings. An example of direct assessment of SLO 1 may be drawn from the BIO-221 (Biostatistics) course, which utilizes pre-/post-testing. Spring semester 2019 yielded matched-score pairs for 23 students; upon evaluation for adherence to a Normal distribution, these data were analyzed via one-tailed paired measures t-test. The included graphic depicts a bar plot of group means with whiskers representing one standard error.

Biology Program Review Assessment Update Spring 2020
Joseph Nolan IV

Single-tail t-test: $t = 6.0532$, $p = 2.153e-06$



Conversely, an example of the analysis of indirect assessments may be drawn from the BIO-480 (Capstone) course, which utilizes a focus group session. For this example, the pooled comments of four contiguous semesters have been analyzed through word-frequency analysis (below image), while grouping similar words to form a word cloud. These restructurings are then examined for recurring themes or trends which may elucidate qualitative trends in any of the SLOs previously stated.

Biology Program Review Assessment Update Spring 2020

Joseph Nolan IV

abilities (1) add (1) advising (2) **advisor** (4) apa (1) application (1) beginning (1)
beneficial (4) best (2) better (2) biology (2) **biostats** (3) biotechnology (1)
bits (1) capstone (2) **care** (4) causing (1) chemistry (2) clarification (1) **class** (4)
closed (2) coordinate (2) **course** (7) covering (1) created (1) **critical** (3)
electives (2) emphasis (1) enrolled (1) ese (1) ethic (1) **faculty** (11) fellow (1)
finish (2) freshmen (1) **grade** (3) happen (1) hear (2) **helpful** (3) hours (2)
important (2) improve (1) increase (1) individuals (1) interest (1) issue (1) lack (1) **lectures** (3)
liked (3) list (1) listened (1) looked (1) **majors** (3) making (1) manuscripts (1) meant (1)
members (3) mentor (2) methodology (1) necessarily (1) **needs** (2) occurred (1)
offer (4) organic (2) outline (1) outside (1) page (1) **perhaps** (2) pieces (1) **practice** (3)
presenting (5) professors (1) program (1) rather (1) **recommendation** (2)
require (3) resources (1) respond (1) **review** (3) saying (1) **science** (2)
scientific (3) six (1) **slides** (2) **students** (5) style (2) **successful** (2)
summer (1) talk (1) **think** (2) timely (1) true (1) **unique** (2) unless (1) week (1) **work** (2) workforce (1)
write (2) year (1) young (1)

- 4) What program revisions or curriculum changes have been made as a result of your analysis of the data?
- The format of BIO-480 (Capstone) has been adjusted as of Fall semester 2017, which now requires students to choose a committee of two faculty and two students. The student is required to give a mock-presentation to this committee, in advance of their graded performance, in order to receive feedback and consider changes prior to evaluation. Second, student presenters may now request that questions be held until the end of their presentation in order to minimize potential for distraction. Third, a "faculty perspectives" day has been included, during which the faculty evaluators discuss their opinions on presentation styles and field questions from the students.
 - Most recently, the Human Biology major was sculpted for the 2019–2020 Academic Year. After consistent BIO 480 (Capstone) assessment indicated lower performance by these majors in science content knowledge and scientific reasoning, modifications were implemented to increase science content, yet maintain the flexibility of the major. Required major-specific courses were transferred to the restricted electives; and within the restricted electives, a biomedical core was created. Students must now take at least one biomedical core course within the required 43 credit hours of restricted electives. Additionally, of the 43 credit hours of restricted electives, 31 must have BIO or CHEM prefixes.
 - The changes to BIO-480 were directly due to the use of indirect assessment in the case of student and faculty feedback, while modifications to the Human Biology major resulted from both direct and indirect measures.
- 5) How is assessment information used to encourage faculty engagement in the assessment of student learning? All majors offered by the program have been regularly assessed by the Department Faculty. During this assessment a faculty member analyzes results of direct and indirect tests/evaluations for a given major and presents his/her finding to the department. To this end, the faculty completed and evaluated Analysis of:
- Changes in the student enrollment;
 - Curriculum comparison with comparable majors from other universities;
 - Analysis of feedback from our alumni;
 - Analysis of feedback from several professionals/employers/graduate schools;
 - Analysis of SLOs mapping; and
 - Content mapping of curriculum when needed.

Biology Program Review Assessment Update Spring 2020

Joseph Nolan IV

6. Timeline for the next three years: Describe your plans for collecting data on the program goals over the next three-years.

SLO's	3-Year Data Collection Plans:		
	2020-2021	2021-2022	2022-2023
1 2 3 4	<p>August: Summer assessment data forwarded to assessment coordinator. Prior semester assessment data discussed at faculty meeting. Alignment matrices for each course are reviewed and any necessary modifications are implemented and documented.</p> <p>December: Assessment data and analyses forwarded to coordinator for collation; alignment to SLO is indicated.</p> <p>January: Fall semester assessment data reviewed during faculty meeting, changes discussed.</p> <p>May: Assessment data and analyses forwarded to coordinator for collation; alignment to SLO is indicated.</p>	<p>August: Summer assessment data forwarded to assessment coordinator. Prior semester assessment data discussed at faculty meeting. Alignment matrices for each course are reviewed and any necessary modifications are implemented and documented.</p> <p>December: Assessment data and analyses forwarded to coordinator for collation; alignment to SLO is indicated.</p> <p>January: Fall semester assessment data reviewed during faculty meeting, changes discussed.</p> <p>May: Assessment data and analyses forwarded to coordinator for collation; alignment to SLO is indicated.</p>	<p>August: Summer assessment data forwarded to assessment coordinator. Prior semester assessment data discussed at faculty meeting. Alignment matrices for each course are reviewed and any necessary modifications are implemented and documented.</p> <p>December: Assessment data and analyses forwarded to coordinator for collation; alignment to SLO is indicated.</p> <p>January: Fall semester assessment data reviewed during faculty meeting, changes discussed.</p> <p>May: Assessment data and analyses forwarded to coordinator for collation; alignment to SLO is indicated.</p>

7. **Previous Reviews:** Address previous Assessment and Accreditation Committee recommendations, and provide an update for how program assessment strengths were continued or improved upon, how any challenges or deficiencies were addressed, and current status.
- 1) The first of these was that the structure of various tracks/majors within the program seemed complex. Though measurement of individual track/major complexity may be subjective, the Biology Program is expansive, and caters to a wide variety of student interests. Within these tracks/majors, core courses
 - 2) such as BIO-124/125, BIO-207, BIO-208, BIO-200, BIO-202, BIO-203 and/or BIO-221 weave a common thread upon which specialized major-specific courses and restricted electives are added. Though ensuring uniformity, these core courses allow for diversity among tracks/majors while mitigating unnecessary complexity.
 - 3) The committee noted "empty classes" appearing in the curricular maps and alignment matrices, and questioned the existence of these. To clarify, the curriculum maps display all courses required of a particular track/major, and are reviewed to ensure assessment of SLOs, yet they do not display every individual assessment performed in every course. Although the faculty of the Biology Program strongly support assessment and clear, concise, linear alignment to the SLOs being measured, courses undergoing revision or development may appear empty on curriculum maps, as these are still required courses within their respective tracks/majors.
 - 4) The committee requested clearer articulation of how the General Studies goals of the University aligned with the SLOs of the Biology Program. To this end, we have simplified and clarified the format of our SLOs, in order to linearly align to the General Studies goals of the University. The aforementioned SLOs have the overarching General Studies goals of the University denoted, parenthetically, in the first section of this update document.
 - 5) The committee displayed concern that assessment measures were identified at the course level, rather than at the Program level. The Biology faculty believe strongly that clear, concise, and linear alignment of Program Goals and Student Learning Objectives should enable reviewers to align an individual course—with its individual objectives—easily to the Program SLO which is being measured. As a result, the Biology faculty feel that the richness provided by alignment matrices furthers this linearity and transparency.